

REMARKS

Applicants respectfully request further examination and reconsideration in view of the above amendments and the arguments set forth fully below. In the Office Action mailed January 11, 2007, claims 1-4, 6, 7, 9-15 and 17-24 have been rejected. In response, the Applicants have submitted the following remarks, amended claims 1, 9 and 17 and added claim 26. Accordingly, claims 1-4, 6-7, 9-15, 17-24 and 26 are pending. Favorable reconsideration is respectfully requested in view of the amended claim and remarks below.

Examiner Interview

On March 22, 2007 the undersigned and Examiner Frances Oropeza conducted a telephone interview. The Applicants respectfully thank the Examiner for her time and attention during the interview. During the interview, the Examiner and the undersigned discussed the rejection of claim 1, and specifically the Rohde reference regarding the same. While no agreement was made as to the allowability of any of the claims in this matter, the Examiner and the undersigned discussed a number of suggestions proposed by the Examiner. The amendments to the claims and the new claim 26 reflect a number of those suggestions made by the Examiner. Again, the Applicants thank the Examiner for her patience and time.

Rejections Under 35 U.S.C. §103

Claims 1-4, 6, 9-14 and 17-23 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,876,351 to Rohde (hereinafter Rohde) in view of U.S. Patent No. 6,238,338 to DeLuca et al. (hereinafter DeLuca), and further in view of U.S. Patent No. 5,967,994 to Wang (hereinafter Wang). The Applicants respectfully renew their arguments to this rejection in light of the claim amendments and Examiner interview.

As stated previously, Rohde teaches a portable modular diagnostic medical device having an interchangeable cartridge system such that the functionality of the device to execute diagnostic medical function such as monitoring ECGs can be utilized and

interchanged. The preferred embodiment of the Rohde invention includes a portable modular diagnostic medical device having a cartridge for monitoring electrocardiograms in a patient. Rohde does not teach the cyclic artifacts as taught and claimed in the present invention. Specifically, Rhode does not teach the method and the system for implementing the method as depicted in Figure 6, and now recited in the independent claims of the present invention. In short, Rohde does not teach acquiring a trigger point in a multi-lead ECG, updating a shift register with a new trigger interval based on the trigger point, determining whether two independent rhythms exist when a predetermined number of trigger intervals have been recorded, such that a second independent rhythm is the cyclic artifact, and selecting any one of the leads that do not include two independent rhythms for analysis.

In contrast to the teachings of Rohde the method and apparatus for analyzing a physiological waveform of the present invention includes the detection of cyclic artifacts and the selection of a lead based on the lack of artifacts. In short, the method and apparatus of the present invention include acquiring a trigger point in a multi-lead ECG, updating a shift register with the a new trigger interval based on the trigger point, determining whether two independent rhythms exist when a predetermined number of trigger intervals have been recorded, such that a second independent rhythm is a cyclic artifact, and selecting any of the leads that do not include two independent rhythms for analysis. Therefore, the Applicants respectfully submit that the Rohde reference does not teach nor make obvious such functionality.

Wang teaches a method and system for characterizing the quality of signals inductive of heart function, wherein the signals in Wang are combined, and analyzed for noise quality. However, Wang does not teach an instrumentation amplifier that is configured to filter the ECG signals, combine the signals to generate a multi-lead ECG, and an analog-digital converter, that allows the multi-lead ECG to be converted to a digital signal and analyzed as a single digital signal for cyclic artifact.

DeLuca teaches a bio-signal monitoring system and method which includes an analog to digital converter. While the DeLuca reference teaches the ability to convert an ECG signal to a digital signal, it fails to teach converting a multi-lead ECG signal into a multi-lead digital ECG signal for analysis to detect cyclic artifact. Therefore, even if combined, the references do not teach, nor make obvious the method and apparatus of the present invention as described and claimed.

The independent claim 1 is directed to a medical device for acquiring and analyzing a multi-lead electrocardiogram comprising an input terminal for connection to a patient to acquire multi-lead ECG signals from the patients, an instrumentation amplifier connected to the input terminal to filter the ECG signals and combine the signals to generate a multi-lead ECG, an analysis module including a processor and software for operating the processor to detect cyclic artifact in the multi-lead ECG and select a lead for analysis based on a lack of cyclic artifact in that lead, and an analog to digital converter connected between the instrumentation amplifier and the analysis module, wherein the multi-lead ECG generated by the instrumentation amplifier is an analog multi-lead ECG, where the analog to digital converter converts an analog multi-lead ECG to a digital multi-lead ECG and wherein the analysis module detects cyclic artifact in the digital multi-lead ECG. As discussed above, neither Rohde, Wang, DeLuca nor their combination teach analyzing a digital multi-lead ECG signal for cyclic artifact. For at least these reasons, the independent claim 1 is allowable over the teachings of Rohde, Wang, DeLuca and their combination. For the same reasons, the Applicants respectfully submit that the independent claims 9 and 17 are also allowable over the teachings of Rohde, Wang, DeLuca and their combination.

Claims 2-4, 6, 10-14 and 18-23 are dependent upon the independent claims 1, 9, and 17. As discussed above, the independent claims 1, 9, and 17 are allowable over the teachings of Rohde, Wang, DeLuca and their combination. Accordingly, claims 2-4, 6, 10-14 and 18-23 are also allowable as being dependent upon an allowable base claim.

Claims 7, 15 and 24 have been rejected under 35 U.S.C. §103(a) as being

Application No. 10/757,174
Response Dated January 11, 2007
Reply to Office Action of March 27, 2007

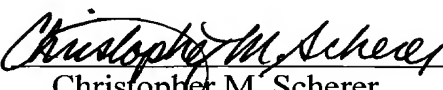
unpatentable over Rohde, DeLuca, and Wang, and further in view of U.S. Patent No. 6,119,035 also to Wang. Claims 7, 15 and 24 are dependent upon the independent claims 1, 9, and 17. As discussed above, the independent claims 1, 9 and 17 are allowable over the teachings of Rohde, Wang, DeLuca and their combination. Accordingly, claims 7, 15 and 24 are also allowable as being dependent upon an allowable base claim.

The Applicants further submit the new independent claim 26. The Applicants have added the independent claim 26 to further clarify the novel aspects of the Applicant's invention, including those functions that are patentable over the cited prior art. The Applicants respectfully submit that the new independent claim 26 includes the limitations as discussed above in the independent claims 1, 9 and 17 that are indeed novel over the cited prior art. Therefore, the independent claim 26 is also allowable over the same prior art.

For these reasons, Applicants respectfully submit that all of the claims are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at 414-271-7590 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,

ANDRUS, SCEALES, STARKE & SAWALL, LLP

By 
Christopher M. Scherer
Reg. No. 50,655

Andrus, Scealess, Starke & Sawall, LLP
100 East Wisconsin Avenue, Suite 1100
Milwaukee, Wisconsin 53202
Telephone: (414) 271-7590
Facsimile: (414) 271-5770